THE KRUEGER PERTUSSIS ANTIGEN

VII†

Up to within the last five years it was intuitively assumed that pathogenic micro-organisms possess the same degree of racial stability as that shown by higher animals and plants. A qualitatively different "mucous membrane phase," "septicemic phase," and "test-tube phase" of the same micro-organism were inconceivable. In contrast with this historical point of view, the new theory of bacterial pleomorphism assumes the existence of such "antigenic variants." Some of the test-tube "phases" of *B. typhosus,* for example, are known to be so different in their effective antigenicities as to resemble wholly unrelated bacterial species.

To prepare logical nonviable specific vaccines, therefore, the new pleomorphism insists that fully virulent pathogenic micro-organisms must be used, that they must be isolated directly from human cases without passage through lower animals and grown exclusively on normal human tissue products, or on nonspecific media enriched with undenatured human specificities. Finally, the resultant bacterial growth must be killed without the denaturing effects of heat, x-ray, bacteriophage, or chemical antiseptics.

An approximation to this theoretical ideal has been developed by Doctor Kreuger of the Department of Bacteriology, University of California, for the pertussis vaccine, whose clinical efficiency is currently endorsed by Doctors Stallings and his colleagues [1] of the Department of Pediatrics, University of California. The Krueger strain of the pertussis bacillus was isolated from the present California epidemic, and was grown exclusively on human-blood-enriched culture medium. The resultant growth was harvested in buffered Locke's solution, was freed from metabolites by centrifugation, and killed by mechanical disruption in a special ball-mill designed for this purpose.[2] Since the Chamberland and Berkefeldt filters were found to alter the antigenic properties of the resultant colloids, the disrupted antigen was freed from the few remaining intact bacteria by passage through a specially calibrated colloidal filter. A water-clear sterile filtrate was obtained.

Thus far the Kreuger antigen has been used in over two hundred reported cases in Fresno and the Bay region. Comparison has been made with 62 untreated cases, and with 129 cases treated with ordinary commercial pertussis vaccine. In judging the relative effects of the two vaccines, the following criteria were adopted: "When severe symptoms, such as hard paroxysmal coughing, whooping, and vomiting subsided within a week after beginning the vaccine therapy, the results were considered excellent; within two weeks, good; within three weeks, fair; three weeks or more, poor." In the untreated group the symptoms usually persisted for from six to twelve weeks. In the group treated with commercial vaccine, but 47 per cent gave evidence of positive therapeutic effects. In the two hundred reported cases treated with the Kreuger antigen, 62 per cent were classified as excellent results; 25 per cent, good; 6 per cent, fair. In only 7 per cent were the results negative, as contrasted with 53 per cent negative results with the commercial vaccine.

Since the Kreuger vaccine was prepared from a strictly local epidemic, its proponents do not predict that it will be equally as effective in other localities or in other California outbreaks. Moreover, the keeping power of the Kreuger antigen is as yet undetermined.

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1 Stallings, M., Frawley, J. M., Kreuger, A. P., Smyth, F. S., and Nichols, V. C.: Preliminary Clinical Report on a New Pertussis Antigen. Read at the annual meetings of the Society for Pediatric Research, New York, N. Y., May 6, 1933. (To be published.)

2 Kreuger, A. P.: Jour. Infect. Dis., 52 (in press), 1933.

THEOBROMIN REËNFORCEMENT OF DIGITALIS ACTION *

The therapeutics of abnormal cardiac conditions is limited, and any suggestion likely to extend its boundaries is welcome. In recent years, coronary disturbances have received the greatest amount of attention in the field of cardiology. This has led to a search for coronary dilators, with a correspondingly increased study of the xanthin group of drugs. Experimental studies in general show this group to have an appreciable coronary dilator action, which is particularly evident when theobromin and theophyllin and their derivatives are used. This action is stronger in the case of theophyllin, but is not inappreciable in the case of the cheaper and more readily procured theobromin. If there is anything in the deficient-circulation theory of the pain occurring in angina pectoris, and in coronary sclerosis and thrombosis (and there certainly seems to be), the astonishing results obtained in the relief of this pain by the use of the drugs mentioned surely confirm the experimental results.

Because of this action in increasing the coronary blood flow, some physicians use these substances prophylactically to retard, if possible, the final breakdown of the heart. Continuous administration, even in the absence of symptoms, in coronary and in simple senile heart cases, by maintaining a constantly increased supply of blood to the myocardium retards, at least theoretically, the changes due to age, the inevitable fibrosis, and serves to strengthen whatever muscle fiber may still be present. And I may say that clinical results do seem to bear out this theoretical reasoning.

However, the point I desire to make is this: If we wish to concentrate a drug in a certain part of the body, or, in other words, if we wish to give a drug a greater chance to exert its effects on a part, it does seem logical that by determin-

* Since the above was written, I have found that many patients who cannot tolerate the theobromin immediately after meals have no trouble at all if it is taken from one to two hours later.